

## **Grade 4 Target A**

### **Domain, Target, Standards, DOK, Vertical Alignments, Achievement Levels, Evidence Required, Vocabulary, Response Types, Materials, Attributes, Question Types, and Question Banks (Examples)**

[Content Domain: Operations and Algebraic Thinking](#)[Target A \[m\]: 4.OA.A Represent and solve problems involving multiplication and division.](#)

[Standards included in Target A: 4.OA.A.1, 4.OA.A.2, 4.OA.A.3](#)

[Vertical Alignment](#)

[Achievement Level Descriptors](#)

[Evidence Required](#)

[Vocabulary](#)

[Response Types](#)

[Materials](#)

[Attributes](#)

[Claim 1: Concepts and Procedures \(DOK 1, 2\) Question Banks](#)

[Claim 2 Problem Solving Questions Banks](#)

[Claim 3 Communicating Reasoning Question Banks](#)

[Claim 4 Modeling and Data Analysis Question Banks](#)

### **Content Domain: Operations and Algebraic Thinking**

#### **Target A [m]: 4.OA.A Represent and solve problems involving multiplication and division.**

#### **Standards included in Target A: 4.OA.A.1, 4.OA.A.2, 4.OA.A.3**

**4.OA.A** Use the four operations with whole numbers to solve problems.

**4.OA.A.1** Interpret a multiplication equation as a comparison, e.g., interpret  $35 = 5 \times 7$  as a statement that 35 is 5 times as many as 7 and 7 times as many as 5. Represent verbal statements of multiplicative comparisons as multiplication equations.

**4.OA.A.2** Multiply or divide to solve word problems involving multiplicative comparison, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem, distinguishing multiplicative comparison from additive comparison.

**4.OA.A.3** Solve multi-step word problems posed with whole numbers and having whole-number

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answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies, including rounding.

### **Vertical Alignment**

#### **Related Grade 3 standards**

3.OA.A Represent and solve problems involving multiplication and division.

3.OA.A.1 Interpret products of whole numbers, e.g., interpret  $5 \times 7$  as the total number of objects in 5 groups of 7 objects each.

3.OA.A.2 Interpret whole-number quotients of whole numbers, e.g., interpret  $56 \div 8$  as the number of objects in each share when 56 objects are partitioned equally into 8 shares, or as a number of shares when 56 objects are partitioned into equal shares of 8 objects each.

3.OA.A.3 Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.

3.OA.A.4 Determine the unknown whole number in a multiplication or division equation relating three whole numbers.

3.OA.C Multiply and divide within 100.

3.OA.C.7 Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division (e.g., knowing that  $8 \times 5 = 40$ , one knows  $40 \div 5 = 8$ ) or properties of operations. By the end of Grade 3, know from memory all products of two one-digit numbers.

3.OA.D Solve problems involving the four operations, and identify and explain patterns in arithmetic.

3.OA.D.8 Solve two-step word problems using the four operations. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies, including rounding.

#### **Related Grade 5 Standards**

5.OA.A Write and interpret numerical expressions.

5.OA.A.1 Use parentheses, brackets, or braces in numerical expressions, and evaluate expressions with these symbols.

5.OA.A.2 Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them.

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5.NBT.B Perform operations with multi-digit whole numbers and with decimals to hundredths.

5.NBT.B.5 Fluently multiply multi-digit whole numbers using the standard algorithm.

5.NBT.B.6 Find whole-number quotients of whole numbers with up to four-digit dividends and two-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.

### **Achievement Level Descriptors**

**Level 1** Students should be able to use the four operations (add, subtract, multiply, and divide) to solve one-step problems involving equal groups and arrays.

**Level 2** Students should be able to use the four operations to solve one-step problems involving an unknown number. They should be able to realize that it is appropriate to multiply or divide in order to solve familiar multiplicative comparison problems.

**Level 3** Students should be able to use the four operations (add, subtract, multiply, and divide) to solve one-step problems involving equal groups and arrays, including problems where the remainder must be interpreted. They should be able to find an unknown number and represent problems using equations with a symbol representing the unknown quantity.

**Level 4** Students should be able to assess the reasonableness of answers using mental computation and estimation strategies, including rounding.

### **Evidence Required**

1. The student solves contextual problems involving multiplicative comparisons, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.

2. The student solves straightforward, contextual problems using the four operations.

### **Vocabulary**

Remainder, sum, difference, quotient, product, equation, times as much, times as many, equation

### **Response Types**

Multiple Choice, single correct response; Equation/Numeric

### **Materials**

multiplication equations, verbal statements of multiplicative comparison, contextual problems involving multiplicative comparison, one-step contextual word problems, measurements limited to: kilometers (km), meters (m), centimeters (cm), kilograms (kg), grams (g), pounds (lb), ounces (oz), liters (L), milliliters (mL), hours (hr), minutes (min), seconds (s), money (whole number \$ or ¢ only), yards (yd), feet (ft), inches (in), gallons (gal), quarts (qt), pints (pt), cups

### **Attributes**

Numbers used in this target must be whole numbers. In describing a multiplicative comparison, the language “times as much” or “times as many” is preferable to “times more than.”

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**Claim 1: Concepts and Procedures (DOK 1, 2) Question Banks**

Students can explain and apply mathematical concepts and carry out mathematical procedures with precision and fluency.

**Claim 1 4.OA.A.2 DOK Level 1**

Multiply or divide to solve word problems involving multiplicative comparison, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem, distinguishing multiplicative comparison from additive comparison.

**Evidence Required**

The student solves contextual problems involving multiplicative comparisons, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.

**Question Type 1:** A cat has 4 times as many toys as a puppy. The puppy has 12 toys. How many toys does the cat have?

Enter your answer in the response box.

Rubric: (1 point) The student solves for an unknown and enters the correct number (e.g., 48).

Response Type: Equation/Numeric

**Question Type 2:** The student is presented with a contextual problem involving multiplicative comparison with an unknown factor. The unknown is a quantity of objects or measurement quantity.

1. A cat has 2 times as many toys as a puppy. The cat has 10 toys. How many toys does the puppy have?

Enter your answer in the response box.

**Question Type 3:** The student is presented with a contextual problem involving multiplicative comparison that solves for an unknown factor. The unknown is the multiplier that describes how many times more one quantity is than the other.

1. Josh and Aaron are collecting shells at the beach. Josh collects 9 shells and Aaron collects 36 shells. How many times more shells does Aaron collect than Josh?

Enter your answer in the response box.

(1 point) The student solves for an unknown and enters the correct number (e.g., 5; 4).

Response Type: Equation/Numeric

### **Claim 1 4.OA.A.4 DOK Level 2**

Use the four operations with whole numbers to solve problems.

#### **Evidence Required:**

The student solves straightforward, contextual problems using the four operations.

**Question Type 1:** The student is presented with a contextual problem using any of the four operations.

1. Tanya ran 400 meters on Tuesday. She ran 800 meters on Wednesday. What is the total number of meters Tanya ran these two days?
2. A container holds 750 milliliters of water. Jess drank 90 milliliters of the water. How many milliliters of water remain in the container?

Rubric: (1 point) The student correctly solves the word problem (e.g., 1200; 660).

Response Type: Equation/Numeric

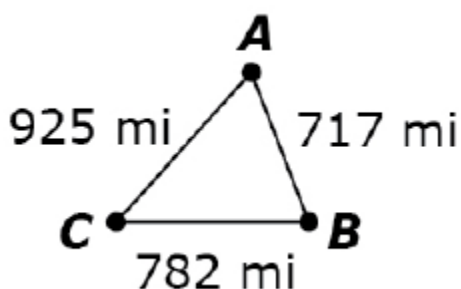
### **Claim 2 Problem Solving Questions Banks**

[Claim Descriptors and Targets](#)

Students can solve a range of complex well-posed problems in pure and applied mathematics, making productive use of knowledge and problem-solving strategies.

#### **Example 1**

Pia's family drove from City A to City B, then City C, and back to City A. The map shows the distances.



How many miles did they drive all together? Enter your answer in the response box.

Rubric: (1 point) The student enters the correct total distance (2424 or 2424 mi).

Response Type: Equation/Numeric

Commentary: The level of difficulty for this item can be raised by changing the number of cities or having distances in the diagram that are not needed to answer the question, although adding in these extra levels of complexity moves the item closer to a Claim 4 task.

### Example 2

Tina and Marco play a number game. Tina gives Marco a number and he does three computations.

- He multiplies the number by 2.
- He adds 7 to the answer.
- Then, he subtracts 2 from that answer.

What number should Tina give Marco so that the final answer is 37 ?

Rubric: (1 point) The student enters the correct number (16).

Response Type: Equation/Numeric

### Example 3

There are 70 students traveling to a soccer tournament. All of the vans can take 9 students each.

How many vans are needed to take all of the students to the tournament?

Enter your answer in the response box.

Rubric: (1 point) The student enters the correct number of vans needed (8).

Response Type: Equation/Numeric

### Example 4

Najoo is 10 years old. Her pet turtle is 40 years old. How do their ages compare?

- A. Najoo is 4 years older than her turtle.
- B. Her turtle is 4 years older than Najoo.

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- C. Najoo is 4 times as old as her turtle.
- D. Her turtle is 4 times as old as Najoo.

Rubric: (1 point) The student selects the correct option (D).  
Response Type: Multiple choice, single correct response

**Claim 3 Communicating Reasoning Question Banks**  
[Claim Descriptors and Targets](#)

Students can clearly and precisely construct viable arguments to support their own reasoning and to critique the reasoning of others.

**Example 1**

Carter says, “8000 is 100 times as large as 80.” Choose three statements that support this claim. Drag them into a logical order.

- 1.
- 2.
- 3.

So 8000 is 100 times as large as 80.

80 is 10 times as large as 8.

800 is 10 times as large as 80.

8000 is 10 times as large as 800.

$10 \times 10 = 100$

$10 \times 100 = 1000$

$80 \times 10 = 800$

$800 \times 10 = 8000$

Rubric: (1 point) The student selects three statements that complete an explanation for the claim and puts them in a logical order. In this particular example, the order doesn’t matter.

Exemplars:

- 1. 800 is 10 times as big as 80. 1.  $80 \times 10 = 800$
- 2. 8000 is 10 times as big as 800. 2.  $800 \times 10 = 8000$
- 3.  $10 \times 10 = 100$  3.  $10 \times 10 = 100$

Response Type: Drag and Drop

**Example 2**

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Rectangle A is 4 times as long as rectangle B.  
Rectangle B is 3 times as long as rectangle C.

How many times greater is rectangle A than rectangle C?

times

Choose three equations that, when taken together, support your claim. Drag them into a logical order.

- 1.
- 2.
- 3.

$4 \times A = B$	$3 \times C = B$
$4 \times B = A$	$4 \times (3 \times C) = A$
$3 \times B = C$	$3 \times (4 \times C) = A$

Response Type: Equation/Numeric and Drag and Drop

#### **Claim 4 Modeling and Data Analysis Question Banks**

##### [Claim Descriptors and Targets](#)

Students can analyze complex, real-world scenarios and can construct and use mathematical models to interpret and solve problems.

##### Example 1

Sarah is helping her dad make cookies for her class using a recipe they found online. Her dad asks, “Do you think one batch of cookies will be enough?” Select all of the information they need to answer the question.

- A. The amount of flour in the recipe.
- B. The number of cookies in one batch.
- C. The number of students in the class.
- D. The temperature of the oven for baking the cookies.
- E. The number of cookies you can fit onto a cookie sheet.

Rubric: (1 point) The student selects the correct pieces of information (B and C).

Response Type: Multiple Choice, multiple correct response

##### Example 2

Which situation is represented by the equation  $4 \times 3 = \square$ ?

- A. A kitten weighs 4 pounds. A puppy weighs 3 times as much as the kitten.

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How much does the puppy weigh?

B. A kitten weighs 4 pounds. A puppy weighs 3 pounds more than the kitten.

How much do they weigh altogether?

C. A kitten weighs 4 pounds. A puppy weighs 3 pounds more than the kitten.

How much does the puppy weigh?

D. A kitten weighs 4 pounds. A puppy weighs 3 times as much as the kitten.

How much do they weigh altogether?

Rubric: (1 point) The student correctly identifies the context that represents the multiplication equation as a multiplicative comparison (A).

Response Type: Multiple Choice, single correct response